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ABSTRACT

Two groups of preschoolers and one of young grade-schoolers were tested for their comprehension of presuppositions and negation in complex syntax. Four types of sentences were presented: affirmative and negative versions of sentences with factive main predicates (which presuppose the truth of the proposition of the complement clause) and with nonfactive main predicates (which do not). Results indicated that competence increased into the early school years: the oldest children showed a fair mastery of the syntax-semantics of the predicates tested. The younger children showed errors of two different kinds, described as the overextended negation tendency and the overextended affirmation tendency. Both of these errors decreased markedly in the oldest group. The nonunitary nature of the acquired competency is discussed. In particular, it is pointed out that factivity is not a grammatically marked operation and, as such, it leads to what appears to be a gradual acquisition pattern; the test of factivity comprehension employed demanded a competence beyond that of normal use. (Author/AA)

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A Developmental Study of Factivity and Negation in Complex Syntax

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A Developmental Study of Factivity and Negation

in Complex Syntax

Recent innovations in linguistics have led a number of psycholinguists into exploring a new area, somewhere between syntax and semantics, as they have been traditionally defined. This new domain, the presuppositional character of certain words and phrases, has been the focus of a number of experimental studies, using both adults (Harris, 1974a, 1974b; Offir, 1973) and children (Harris, 1975; Macnamara, Baker & Olson, 1976) as participants.

As there is much debate even within linguistics as to a satisfactory definition of the term presupposition (Garner, 1971), we shall present a brief exposition of this topic with an emphasis on those aspects pertinent to our study with young children.

Kiparsky and Kiparsky (1971) have discussed how a speaker's use of certain predicates, which they call factives, implies that he presupposes the truth of the proposition of the following complement. Let us look at the following set of sentences.

1: a) Susan knows that the teacher eats horsemeat.

b) Susan believes that the teacher eats horsemeat.

c) The speaker of 1a believes that the teacher eats horsemeat.

In sentence 1a the superordinate predicate know is a factive which takes as its complement the clause that the teacher eats horsemeat. The meaning of sentence 1a includes the information listed in 1b and 1c, with 1c representing the presupposed content.

A classic test for a predicate being of the factive type is that the proposition of the complement sentence is presupposed to be true whether or not the factive predicate is negated. Compare 1a with 2, its negated version. In both 1a and 2

2. Susan doesn't know that the teacher eats horsemeat.

the speaker presupposes the truth of the proposition that the teacher eats horsemeat; whether Susan is acquainted with this information does not affect the presupposed truth of the proposition.

In contrast, the meaning of non-factive predicates carries no assumption of the truth of the proposition of the complement. The non-factive predicate want, like the factive be happy, denotes a positive reaction towards something, but only to a possibility, not to an established fact. This difference between a factive predicate, which presupposes the truth of the proposition of its complement sentence, and a non-factive, which does not have this presupposition, is shown in the following contrastive sets:

3. Non-Factive

   a) Harry wants everyone to like him.

   b) doesn't want

4. Factive

   a) Harry is happy that everyone likes him.

   b) isn't happy

Other non-factives, such as be true and be possible, make assertions about the likelihood of the proposition of the complement sentence. There is often a clear change of believed likelihood under negation for non-factives, as illustrated in the sentence pairs in 5 and 6.

5. a) It's true that General Motors owns Iceland.

   b) not true

6. a) It's possible that Marie is wearing a wig.

   b) not possible

Below are summarized some major characteristics of factive and non-factive predicates:

Factives	Non-Factives
Complement sentence presupposed to be true.	Complement sentence not presupposed to be true.
Truth value of complement unchanged by negation of predicate.	Likelihood of complement often changed under negation.

The proper use of factive and non-factive predicates presents a formidable challenge to the language learning child. The child must learn the central meanings of these predicates, a considerable task as most of them refer to mental states. In other words, the referential meanings of predicates like know and think could never be explained by concrete demonstration or illustration alone. The meaning of these predicates also includes the presence or absence of the presupposed truth of the proposition of the complement sentence. This in turn is accompanied by a determination of the effect of negation of the predicate on the interpretation of the complement sentence. It is this problem of the differential consequences of negating the predicate that forms the focus of the present study. With an exception to be discussed later (Harris, 1975), our knowledge of the interaction of the semantics of negation and its effect on the interpretation of embedded complement sentences is presently quite sparse.

Operationally, our test was based on the fact that the classic test for factive predicates is the unchanging truth value of the complement when the predicate is negated. We needed, then, to present sentences with both affirmative and negative factive main predicates and see whether the children responded differentially to their complements. We anticipated that many preschoolers would show this inaccurate differential responding, a sign of lack of complete understanding of factivity. To be specific, we expected that many young children would inappropriately extend the scope of

negation of a negative factive sentence into the complement. This inaccuracy can be illustrated by looking at the negative factive sentence 2. According to our expectations, sentence 2 would be inappropriately interpreted by some young children as the paraphrase of sentence 7. This possible error, the tendency to overextend the scope of negation in factive sentences

2. Susan doesn't know that the teacher eats horsemeat.

7. Susan knows that the teacher doesn't eat horsemeat.

is represented below:

Overextended Negation Tendency

A negated predicate in the superordinate clause of a complex sentence negates the proposition in the subordinate clause.

Taking the case of non-factive predicates, it was necessary to determine whether children could interpret a predicate negation as having any effect on the interpretation of the complement sentence, as in pairs like 5 and 6. In other words, we needed to know that a correct interpretation of negative factive sentences was not merely the consequence of a general lack of understanding of negation in complex syntax. As there is very little reported research on this topic, the understanding of negation in complex syntax, we took the necessity to establish a comparison set as the opportunity to pursue this other topic also. The possible error of failing to distinguish between the meanings of 5a vs. 5b and 6a vs. 6b is represetned below:

Overextended Affirmation Tendency

A negated predicate in the superordinate clause of a complex sentence has no effect on the interpretation of the proposition in the subordinate clause.

Finally, we were interested in whether the development of the understanding of factivity proceeded more quickly in some predicates than others.

Consider the predicates know and be happy, illustrated in 8 and 9. Both know and be happy are factives: the speakers presuppose in both sentences

8. John knows that Marion is eating the pudding.

9. John is happy that Marion is eating the pudding.

that Marion is eating the pudding. But know is a simpler factive, and its meaning is contained in that of be happy. Know refers to a simple state of awareness of a truth; be happy refers to both an awareness of a truth and also a positive emotional reaction to it. Given that middle-class children have some notion of the uses of know and be happy by the ages of three and a half (Borke, 1971; Brown, 1973; Limber, 1973), we still might expect that the knowledge of know as a factive predicate would precede knowledge of be happy as a factive predicate.

Similarly, there are interesting differences among non-factive predicates. When some non-factive predicates are negated, like not be possible and not be true, they require a negated interpretation of the complement sentence; other negated non-factives, like not think and not want, do not strictly require this negated interpretation. This will be discussed more fully in a later section. In conclusion, another aspect of the study was the inclusion of a variety of factive and non-factive predicates as material for investigation.

Method

Subjects

The participants were 60 children, divided into three age groups of 10 boys and 10 girls each: Group I (3-6 through 4-5, mean age = 4-2, Group II (4-6 through 5-5, mean age = 5-0) and Group III (6-0 through 7-11, mean age = 7-1). Children in Groups I and II attended a Minneapolis nursery school, and children in Group III were enrolled in Saturday morning art classes at the University of Minnesota. All of the children were of

middle to upper-middle class backgrounds.

Materials.

The basic methodological problem was to discover whether or not the children believed that the proposition of the complement sentence held true under various conditions of affirmation and negation of factive and non-factive predicates. Our interest was in making the task requirements as transparent as possible, even to small children, while at the same time requiring a response which related directly to the specific content of each sentence. In this way we hoped to minimize the two problems of an overly confusing situation, on the one hand, and response sets, on the other hand.

The sentence frames consisted of four types:

Affirmative Factive - that - Agent - Complement Activity

Negative Factive - that - Agent - Complement Activity

Affirmative Non-Factive - that - Agent - Complement Activity

Negative Non-Factive - that - Agent - Complement Activity.

The child was forced to make a choice between two possible agents for an activity described by the complement: one of the agents was explicitly mentioned in the complement, the other not. For example, the child would have in front of him or her a fish, a bunny, and a tree and hear sentence 10.

10. It isn't surprising that the fish pushes the tree.

Since be surprising is a factive, its negation does not affect the truth of the complement that the fish pushes the tree and so the fish should be chosen. For the non-factive be true, a negation should dictate choice of the unmentioned agent. Sentence 11 implies that the unmentioned agent,

11. It isn't true that the fish pushes the tree.

the bunny, must push the tree, given the forced choice nature of the task.

In order to determine whether the child was able to choose an agent by negative inference in the manner required, and also to acquaint the

child with the experimental task, each participant was first presented two simple affirmative sentences and four simple negative sentences with the same forced-choice-of-agent context. Examples included sentences 12 and 13. There were also two sentences which did not conform to the

12. The girl drives in the car (with a boy and girl present).

13. The bunny doesn't eat the dinner (with a fish and bunny present).

forced-choice-of-agent design, as illustrated in sentence 14. These were

14. Either the boy rides down the hill or the girl rides down the hill (with a boy and girl present).

presented as a reminder that sometimes one cannot accurately identify a single agent who performs an activity.

The experimental sentences consisted of 40 sentences in blocks of 20 factives and 20 non-factives. Within each block were 5 predicates, each presented twice in the affirmative and twice in the negative. The factive predicates were know, be surprising, be happy, be nice and be sad. The non-factive predicates were think, be possible desire, be true and want. Within each block affirmative and negative sentences alternated with one another. There were 10 complement sentences used with the predicates, randomly represented once each in the first set of 10 sentences within each block and once each in the second set. No predicate was followed by the same complement sentence.

The complement sentences consisted of an animate agent and an easily acted out action on another object, always in the present tense. For examples, see sentences 19 through 22. The explicit complement agent choices were fish/bunny for one block of sentences and boy/girl for the other. Half of the children had the fish and bunny for the factive predicates, half had them for the non-factives.

For some predicates the impersonal subject *it*, as in *it's nice*, cannot be used. For these predicates, the experimenter held a Dumbo hand puppet, who was named as the animate subject of the predicate, as in sentence 15.

15. Dumbo knows that the girl rides down the hill.

Another feature of the materials was the use of ungrammatical sentence forms with two of the predicates, *want* and *desire*. These two predicates do not generally take complements of the form *that + S*, as in sentence 16. Both predicates take infinitival complements instead, as illustrated

16. Dumbo wants that the boy sits in the chair.

in sentence 17. Nevertheless, we wished to avoid any differences in response

17. Dumbo wants the boy to sit in the chair.

that might be caused by the different complement forms and so all predicates in the study were followed by complements of the form *that + S*, including the predicates *want* and *desire*.

Procedure

Each child was tested individually by the same experimenter in a room at her or his school. The necessary toys were in front of the child, who was seated with the experimenter on the floor. The child was presented one of the sets of agent toys and was told that one of them was to do something, and the child would find out which one by listening carefully and repeating what the experimenter said. The repetition assured that the child actually processed the negative particle in negative sentences. The warm-up simple sentences (i.e., without complements, such as sentences 12 through 14 above) were presented in the manner indicated by 18:

18. E: The girl drives in the car (with boy and girl present).

S: The girl drives in the car.

E: Who drives in the car?

S: The girl (correct response).

While the experimenter asked the question, she pointed to the boy and girl dolls. After the child answered the question, he or she was encouraged to perform the appropriate activity for the complement sentence, if this had not been done spontaneously.

After the warm-up sentences were presented, the child was asked if she or he had any questions. The experimental sentences were then presented, half of the children receiving the factive sentences first, and half receiving the non-factives first. The procedure for the experimental sentences took the same format as that for the warm-up sentences, as illustrated in 19 through 22 below for the four different types of sentences with the appropriate responses indicated for the child.

19. Factive Affirmative

E: It's surprising that the bunny eats dinner (with bunny and fish present).

S: It's surprising that the bunny eats dinner.

E: Who eats dinner?

S: The bunny (correct response).

20. Factive Negative

E: It isn't nice that the fish pushes the tree (with bunny and fish present).

S: It isn't nice that the fish pushes the tree.

E: Who pushes the tree?

S: The fish (correct response).

21. Non-Factive Affirmative

E: It's true that the boy sleeps in the bed (with boy and girl present).

S: It's true that the boy sleeps in the bed.

E: Who sleeps in the bed?

S: The boy (correct response).

22. Non-Factive Negative

E: It isn't possible that the girl bumps into the duck (with boy and girl present).

S: It isn't possible that the girl bumps into the duck.

E: Who bumps into the duck?

S: The boy (correct response).

One child refused to participate in the study from the beginning. Six more children were tested in Group II than were needed in order to permit each child in the classroom to take part; their response sheets were randomly chosen to be excluded from the analyses. No child had any difficulty with the warm-up sentences, and all children completed the entire procedure in one sitting.

Results

Scoring

The critical response was whether or not the child chose the mentioned complement agent as the actor of the complement activity. We shall refer to the choice of the mentioned complement actor as "affirming the complement," and to the choice of the unmentioned actor as "denying the complement" in subsequent discussions. Although the response option of saying that one couldn't tell who performed the activity was presented in the warm-up sentences, only one child used this response. This child's responses were excluded in the subsequent analyses as one of the six "excess participants." The infrequency of the "can't tell" response was not surprising in light of the encouragement the children received to pick between the two dolls presented.

General Analyses

As the effect from the different orders of presentation did not approach significance the two orders were combined in all analyses. Rather than an analysis of the results in terms of simple accuracy, the unit of analysis was how often the children denied the complement in response to the different sentence types. In other words, scores presented in Table 1 represent

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Insert Table 1 about here

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the average number of times the children said that the unmentioned agent

performed the activity of the complement sentence.

The general trend is clear: denying the complement becomes more common with age group as a response to negative non-factives. In the other three sentence categories, affirming the complement becomes more frequent as age increases. In particular, the difference between affirmative and negative factive sentences has largely vanished among the oldest children, Group III.

More specific analyses substantiate these impressions. Consider the prediction of an Overextended Negation Tendency, that younger children would show some evidence of overextending the negative interpretation of the main predicate into the complement of factive sentences, thus denying the complement of negative factives such as sentence 20. In general the children did deny the complement more often for negative factives than for affirmative factives ($F(1,57)= 24.41$, $p < .001$). This tendency to treat the complements of negative and affirmative factives differentially diminished with age ($F(2,57)= 5.00$, $p < .05$), and, in Group III there is no difference in the responses to the two different types of factive sentences ($t(19) < 1.0$, $p > .20$). The Overextended Negation Tendency, then, has found support in our examination of the factive sentences and appears to be a developmental phenomenon which diminishes in strength over the years of the participants in our study.

Similar analyses for the non-factive sentences show that the children more often denied the complements of negative than affirmative non-factives ($F(1,57)= 95.55$, $p < .001$); the difference is statistically significant in Group I ($t(19)= 3.89$, $p < .001$) and increases with age group ($F(2,57)= 5.00$, $p < .05$). In terms of these data, then, we find evidence of discrimination between the affirmative and negative non-factives even among the youngest age group with the differentiation more pronounced among the older groups. This lends internal support to the design of the study as it

demonstrated that denying responses appeared most frequently where they were appropriate. The Overextended Affirmation Tendency cannot be tested at this point with these data as the variety of referential meanings within the non-factive predicates precludes establishing a baseline of accurate responses. Rather, this tendency needs to be examined with reference to the responess of individual participants. Consequently, we will now turn to an examination of response patterns according to both individual participants and also individual predicates within each factivity set.

Response Patterns

Individual Participants. A surprising finding was that a large number of children, mostly younger ones, rarely or never denied the complement. A child was classified as an "overaffirmer" if she or he failed to give as many as three complement denials in any one of the four sentence categories. The resulting group of 17 children gave an average of 0.82 complement denials in response to all 40 sentences. Nine of the 20 Group I children were overaffirmers, five in Group II, and three in Group III.

In this way we find support for the Overextended Affirmation Tendency based on an examination of individual participants' responses. Overaffirmers may have had a systematic difficulty in linguistic competence. But the difficulty likely stemmed at least in part from a task-specific strategy, especially given that overaffirmation was found even in a few Group III children. Only the complement sentence was questioned and was to be acted out, and these subjects probably paid attention only to the clause that described the relevant activity. A similar strategy of paying attention only to a last subordinate clause if it could be independently analyzed has been found by Winston (Note 1) and Harris (1975) in other tasks involving the comprehension of complex sentences. Since there is some chance that these subjects' responses were largely the result of only a partial analysis

of the test sentences, their responses are not included in the analysis of results for the individual predicates.

Factive Predicate Analyses. As described earlier, each participant was presented 40 sentences: each of the five factive and five non-factive predicates appeared in two affirmative sentences and two negative sentences. We will now examine differential responding within the factivity predicates; below we will discuss the non-factive predicates.

We established a criterion to indicate when a child comprehended a factive predicate correctly: a child was classified as having attained criterion only when he or she gave an affirming response to all four examples of the particular factive predicate (i.e., the two negative sentences and the two affirmative sentences of each predicate).

The resulting patterns of responses are given in Table 2 for each

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Insert Table 2 about here

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factive predicate within the three age groups. Of the 43 children who were not overaffirmers, 11 did not pass the criterion for any of the predicates. Nineteen children, 12 from Group III, passed the criterion for all five factive predicates. The general tendency was for the more emotionally neutral predicates (know, be surprising) to be easier than the predicates expressing an emotionally evaluative reaction (be sad, be nice, be happy).

In order to test more specifically whether an emotionally evaluative predicate was more difficult than a more neutral predicate we contrasted know with be happy. Both of these predicates take an animate subject and the meaning of the emotionally evaluative be happy includes the meaning of the neutral know. Of the 24 children who passed criterion for one to four of the five factives, 13 responded correctly to know while just three of these children responded correctly to be happy: no child passed criterion for be happy but not for know.

The children's problems with the emotionally evaluative, or affective, predicates were of two different but related kinds. First, when the predicates be nice and be happy were negated there was the tendency to deny the truth of the complement proposition. When the children heard sentences such as 23 their reaction may have been to attempt to rectify an unpleasant

23. Dumbo's not happy that the boy eats dinner.

situation by denying the complement, that is, responding that the girl eats dinner. Following from this pragmatic scheme, one would expect the affirmative versions of be sad to be denied. This was in fact the second type of problem: the largest number of denying responses observed for affirmative sentences followed the predicate be sad. This represents a pragmatic type of error which cannot be accounted for by either of our predicted tendencies of grammatical misunderstanding.

Non-Factive Predicate Analyses. Aside from the negative non-factives not be possible and not be true and the affirmative be true, the non-factive sentences strictly speaking did not require an affirming or a denying response. Their major use in this investigation was to provide a contrastive test to that of the factives. As shown previously, the negative non-factives as a group received significantly more denying responses than their affirmative counterparts. The responses to the non-factive sentences were further investigated in two ways. First, we shall present a within subject analysis according to each predicate and, secondly, an across-subject analysis of each predicate, separately for the affirmative and negative sentences.

First, then, we determined for each child whether more denial responses were given for the affirmative or for the negative version of each predicate. This was possible as each child made two responses for the affirmative version of each predicate and two for the negative; tie cases were excluded. Table 3 presents the number of children, totaled over the three age groups,

who gave more denial responses to either the affirmative or negative versions of a particular predicate. The figures in Table 3 indicate that a

Insert Table 3 about here

significant proportion of children gave more denial responses to the negative versions than the affirmative versions for each of the five non-factive predicates (Binomial Sign Test, $p < .001$ for each of the five cases).

The comparable figures for the factive predicates are included in Table 3 for the purpose of contrast. Note that among the factive predicates only be happy and be nice show a similar pattern of significantly more children giving more denial responses to the negative than the affirmative versions. Only three of the 17 children giving more denials for not be happy and two of the 15 children for not be nice were from the oldest children, Group III. This is seen as evidence that this pragmatic response pattern was primarily restricted to the two younger groups of children.

For our second analysis of the non-factive predicates we determined the percentages of denial responses for each predicate for each age group, considering each of the two responses independently. These are presented in Table 4 separately for the affirmative and negative versions of each

Insert Table 4 about here

predicate. We can see that there is a steady progression from the youngest group to the oldest among the affirmative versions: with each age group there is a decreasing tendency to deny the complements of each predicate. The figures for the negative versions cannot be summarized as succinctly.

Let us begin by outlining what we would anticipate as responses to the negative non-factive sentences among adult speakers of English who were given the two response options that these children used. The sentences

with not be possible and not be true require denial responses. The other three negated non-factive predicates, not think, not desire, and not want, do not require an affirming or a denying response, although one could expect that a knowledgeable, agreeable person would give more denial responses to the negated version than to the affirmative version. In sum, though it is impossible to establish absolute target baselines for denial responses among these three non-factives, we anticipated that knowledgeable persons would give more denial responses to these three negated non-factives than to their affirmative versions and fewer denial responses than to not be possible and not be true sentences.

The responses of the 17 children in Group III fit these expectations fairly well. Specifically, in responding to not be true and not be possible these children denied the complement an average of 91% of the time, or, nearly always. But when they heard the predicates think, want, and desire negated, the average rate of complement denial was just 64%, as is appropriate. This difference in the responses to true-possible vs. think-want-desire negative sentences is highly significant in Group III ($t(16) = 3.65$, $p < .005$).

The performance of the Group I children presenta an interesting contrast with the oldest group. Identical to the Group III responses, the mean rate of denial for not be true was very high, 91% of the time. However, Group I children also nearly always denied the complement after not want. We are left to speculate that the complete symmetry (symmetry here refers to an obligatory affirming response for the affirmative version and an obligatory denying response for the negative version) of the predicate be true facilitated the youngest children in understanding the necessity of denial responses when this predicate was negated. In this respect be true contrasts with be possible which also requires a denial when negated but

does not require an affirming response when in the affirmative, and is thus a semantically more complex predicate.

But why did the youngest children use so many denial responses to not want sentences? We suspect that many young children hear this negated predicate used as an absolute imperative; that is, sentences such as 24

24. I don't want you to eat that cookie.

25. Don't you eat that cookie.

occur frequently in speech to young children with the pragmatically accurate but grammatically incomplete paraphrase of sentence 25. It is possible that from numerous exposures to the negated non-factive predicate not want in sentences such as 24 that young children first understand this negated predicate as requiring a denial response of the complement; in this way not be true and not want are (inaccurately) understood as being similar to each other and different from the other non-factive predicates we used. This difference in responses to true-want vs. think-desire-possible negatives is highly significant in Group I ($t(10) = 3.86$, $p < .005$).

How do the responses of the Group II children correspond to those of the other children? The most noticeable aspect of Group II's responses to the negated non-factives is that for four of the five predicates their rate of denials is lower than both the younger and the older children. As with the younger children in Group I, the children in Group II gave significantly more denial responses to not be true and not want than to the other three predicates ($t(14) = 4.07$, $p < .005$). This does not take account of the general low level of denial rate among the Group II children. We shall turn to this topic next.

Order of Presentation. A possible explanation for the general phenomenon of depressed denial responses among Group II children comes from a comparison of those Group II children who received the factive predicates first vs.

those who received the non-factives first. As mentioned earlier, the general effect from the different orders of presentation did not approach significance. However, there were some striking differences in the responses of the children in Group II depending on the order of presentation.

First, only in Group II did the order of presentation seem to influence the likelihood of children being labeled as overaffirmers. Groups I and III children were just as likely to be overaffirmers with either order of presentation. In Group II, however, four of the five overaffirmers received the factive sentences first. Secondly, even among the children not labeled overaffirmers those children who received the factive sentences first gave many fewer denials than the children with the other order of presentation. This is most clearly seen when one examines the responses to the negative non-factive sentences: the children who heard the factive sentences first gave about half as many denials as the children who heard the non-factive sentences first, 30 vs. 58.

This difference in rate of denials to non-factives for the Group II children, dependent on order of presentation, needs to be considered in the context of the general phenomenon of growing differentiation between factive and non-factive predicates over the three age groups. It would seem that the children in Group II, in contrast to those in Group I, were sufficiently sensitive to the presuppositional characteristics of factive predicates so that initial exposure to 20 sentences with factive predicates, even without corrective feedback, influenced their comprehension of negative non-factive sentences. The children in Group III, as we saw in their fine discrimination between the negative sentences with <u>true-possible</u> vs. <u>think-want-desire</u>, were solidly aware of the effects of negation of non-factive predicates on their complements. Order of presentation, however, did influence Group III's rate of denial for factive sentences: 17 of the 18 denials for complements

of negative factive sentences were from children who received the non-factive sentences first, as were all 16 of their denials for affirmative factive sentences.

To summarize, order of presentation probably did not produce a significant general effect as it influenced each age group differently. The children in Group I were not as systematically affected by the two different orders as the two older groups; perhaps this was due to their very primitive understanding of the phenomena. The Group II children seemed to overgeneralize the characteristics of factive predicates when they heard these sentences first, giving fewer denial responses to all four types of sentences and especially to the negative non-factives, where such denial was appropriate if not always mandatory. It was as though the developing comprehension of factivity exhibited by Group II children depressed their former understanding of negation in non-factive sentences. The children in Group III show a much sturdier understanding of negation in non-factive sentences but only demonstrated (nearly) flawless understanding of the factive sentences when they hadn't first heard non-factive sentences.

General Discussion

The overall results indicate a slow progression in understanding factivity and negation, with reasonably good competence in the early middle childhood years of the children in Group III. The results do not support a sudden or clear acquisitional step in the acquisition of factive predicates, a finding which is not surprising considering the nature of the phenomenon. Factivity is not a semantic distinction that is marked in any uniform way by the phonological or syntactic form of predicates or the syntax of the surrounding sentence. In this respect it may be contrasted with a meaning such as that of past tense in English, which, aside from irregular verbs, is marked by a small set of phonologically conditioned

allomorphs. In the acquisition of factive and non-factive predicates the child must learn for each predicate the core meaning of the predicate, whether or not the predicate takes complements at all, and finally, whether or not the truth of the complement is presupposed.

It is quite doubtful that children ever encode factivity as a unitary process or rule in the same manner they may formulate grammatical markers. The "acquisition of factivity" becomes a study of the acquisition of different predicates. What might be expected to develop is a quicker learning of the factive and non-factive characteristics of new predicates; the work undertaken here, however, offers no information about this more subtle question.

In spite of the complication of having to use different analyses, there are some major findings regarding the two tendencies of Overextended Negation and Overextended Affirmation. The first of these deals exclusively with the factive predicates where negation of the predicate should not influence the interpretation of the complement sentence. We found that our two younger groups, essentially preschoolers, often disregarded this identifying characteristic of factive predicates, thus conforming to the tendency. The oldest group of children, on the other hand, showed hardly any support for this characterization. We conclude from these results that the Overextended Negation Tendency accurately characterizes the competence of many preschoolers who do not fully understand that the interpretation of a complement sentence is not affected by negation of a superordinate factive predicate. By middle childhood, then, this distinction is fairly well known although it is still susceptible to modification, as seen in the effects of order of presentation with the Group III children.

An apparent problem develops when one considers the second prediction, Overextended Affirmation. First, when we examined the averaged responses

to the non-factive sentences we found that even with the youngest group of children, denial responses were reliably more frequently given to the negative sentences than to their affirmative counterparts. This demonstrated that as a group the children were accurately interpreting the negative particle in the negative non-factive sentences as often having some influence on the interpretation of the complement sentence. On the other hand, we noted that there was a large proportion of children, 28% to be specific, who rarely if ever gave any denial responses. These children, labeled overaffirmers, constituted 45% of the youngest group and decreased to 25% in Group II and 15% in Group III. In this way we found support for the Overextended Affirmation Tendency by examining individual responses.

Our discussion would not be complete without a comparison with results obtained by Harris (1975), who studied factives, non-factives, and counterfactuals. In the procedures relevant to our study, Harris presented his participants, ranging from nursery schoolers to adults, sentences incorporating the factives know and be happy and the non-factives say and whisper. Each predicate appeared in the affirmative and negative. The participants were read a sentence, for example "David didn't say he was in trouble," and then were asked a question about the truth of the complement, "Was David in trouble?" They were informed that answers should be either "yes," "no," or "can't tell."

As in our study, Harris noted that the greatest period of development occurred between the ages of 4 and 7. Unfortunately, these data are not given according to the age groups of the participants so that specific comparisons with our age groups cannot be made. Also, results are not reported separately for the factive predicates, know and be happy, so it cannot be ascertained whether or not the same comprehension differences between them were obtained.

Harris' results from testing the non-factives say and whisper present certain disparities from our findings. Only among his adult participants were there more "can't tell" responses than "yes" responses to questions such as "Was David in trouble?" after hearing the sentence "David didn't say he was in trouble." The remainder of the participants, nursery schoolers to sixth graders, treated the non-factives as factives. Given the sharp discrimination the Group III children of the present study showed between negative and affirmative non-factives, and also between the negative versions of possible and true vs. think, want and desire, children's command of the semantics of negation is probably greater in middle childhood than implied by Harris' results.

Also, our analyses make quite clear that the specific choice of predicate can dramatically affect one's estimation of a child's understanding of these predicates. If we were to look only at the neutral factive predicates know and surprising we would come to the conclusion that by late preschool age (i.e., Group II) the children showed pervasive understanding of factivity. Pragmatic factors seem to influence the children when they are presented with the affective predicates, and this is quite likely to occur both in the acquisition process and in the experimental studies.

Finally, we should note that, if anything, the results of our study probably lead to an underestimation of children's comprehension of factive predicates. In general a competence should be characterized vis-à-vis various contextual factors: in an experimental situation devoid of supporting context one can expect to assess only fairly well-developed competence or the lack of it. To be more specific, a particular artificiality of testing factives in our experimental context needs to be pointed out explicitly. Factives are generally used to comment on someone's reaction or awareness of a state of affairs the speaker understands to be known and accepted as

true to the listener. The content of the complement refers to this presupposed, old information and sets the context for the new information, conveyed by the main sentence with the factive predicate in it. In our experimental situation, in contrast, the child listened to a sentence and had to infer the presupposed truth of the complement from the use of a factive. What is normally presupposed and already known must in this case be logically derived. Thus it follows that competence in the experimental situation constitutes a definite extension of its usage in more normal situations. What we take then as a simple test for competence is really a very demanding test of that competence plus other competencies. Other aspects of our study, such as the forced-choice design, could also have increased the demands made on the participants.

Reference Note

1. Winston, M.E. Comprehension of relative clause sentences in children. Unpublished M.A. thesis, University of Illinois at Urbana-Champaign, 1972.

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Footnotes

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Table 1

Mean Number of Times Complement Denied

		Factive Sentences		Non-Factive Sentences	
Group	n	Affirmative	Negative	Affirmative	Negative
I	20	1.10	2.65	1.90	4.50
II	20	0.75	1.75	1.15	4.55
III	20	0.80	0.95	0.90	6.45

Note. Maximum score = 10.

Table 2

Number of Children Passing Criterion for Factive Predicates

Group	n	know	surprising	sad	nice	happy	all five
I	11	6	5	3	4	2	2
II	15	11	12	10	6	7	5
III	17	15	15	14	14	13	12
Total	43	32	32	27	24	22	19

Note. Overaffirmers are not included.

Table 3

Number of Children Giving More Denial Responses to Negative or Affirmative Version of Each Predicate

	Affirmative Version	Negative Version	Binomial Sign Test
Non-Factive Predicates			
think	3	26	*
possible	3	31	*
desire	3	26	*
true	0	37	*
want	0	34	*
Factive Predicates			
know	3	5	
surprising	1	5	
sad	6	7	
happy	2	17	*
nice	1	15	*

Note. N = 43 (60 - 17 overaffirmers).

* $p < .001$.

Table 4

Mean Denial Responses for Non-Factive Predicates

	Group	I	II	III
	n	11	15	17
	Sentence Version[a]			
think	+	.36	.20	.09
	-	.68	.40	.76
possible	+	.36	.20	.18
	-	.64	.53	.91
true	+	.27	.13	.09
	-	.91	.73	.91
want	+	.36	.06	.06
	-	.91	.77	.62
desire	+	.36	.17	.12
	-	.68	.50	.53

Note. Overaffirmers are not included. Two responses from each child.

[a]Affirmative versions are indicated by "+"; negative versions by "-".